

2016 AmeriCorps Environmental Stewards – Invasive species management in Mississippi River delta freshwater wetlands

Position Description

Supervised by the ecologist for Jean Lafitte National Historical Park and Preserve, and working with other natural resource management staff and with park interpretive staff as appropriate, the two Environmental Stewards will focus their effort on key invasive species monitoring and management projects at the park's Barataria Preserve. As the Stewards gain familiarity and confidence with these projects, they will train and coordinate volunteer effort and will help develop within-park communication and public education about each focal invasive species project. Invasive species have negative impacts on the Preserve's (and the region's) native species, ecosystem function and services and economic activities, as well as on visitor 'experience'. Invasive species diminish the value of the resources the park protects and reducing their impacts is a park-wide priority. As time allows, Stewards also may contribute to other natural resource management projects.

This is a 10 week full-time (40 hours/week) commitment, beginning in May 2016. (*The park has some flexibility regarding start date.*) Each Steward will receive \$250/week stipend and an AmeriCorps Segal educational award that may be used toward the cost of future formal education. The park does not provide housing. Applicants for these Steward positions should have completed, or be working toward, a Bachelors degree in biology, natural resource management, environmental science, or a related field, and should possess sound scientific skills including experimental design, data management, data analysis, and familiarity with using basic laboratory and field equipment. Additionally we seek Stewards who enjoy and wish to further develop their written and oral communication skills. The Stewards will work outdoors much of the time, exposed to the hot humid climate, biting insects and other stresses and dangers of this region. Applicants should be comfortable with working on and off of developed trails in both aquatic and terrestrial habitats. As the Stewards will work as part of a team and also independently, we seek individuals who operate effectively in both situations.

For more information, and/or to apply, contact Dr. Julie Whitbeck (email link at <http://www.nps.gov/jela/getinvolved/workwithus.htm>) The park will review applications on a rolling basis beginning April 1st. We seek to select Stewards by late April.

Goals for Steward

Our overall goals for the 2016 Environmental Stewards are to 1) re-invigorate and/or maintain invasive species management and monitoring programs developed by previous Stewards and other partners, 2) coordinate volunteer effort on these projects, and 3) contribute to educating park staff and the public about these invasive species and our monitoring and control efforts. Key elements of the floating aquatic invasive species monitoring and management program – and of the Steward's work – include sustaining the (re)-introduction and distribution of biological control agents for Giant Salvinia, Water Hyacinth and other floating aquatic invasive species in selected waterways, implementing a monitoring protocol assessing focal invasive species coverage and bio-control agent populations in these waterways, coordinating Park volunteer effort on this project, and producing bi-weekly reports on waterway accessibility for Park staff and the public. Key elements of the invasive feral hog program center on impacts assessment, including working with partner investigators to hone an impacts assessment protocol and implementing that protocol (with park staff & volunteer support). According to interest and time, the Steward could develop interpretive guides and/or programs communicating the need for, aims of, and status of these invasive species projects.

The Environmental Steward will be mentored and supervised by the park's Ecologist, with assistance from other natural resource management staff, and with guidance from Barataria Preserve interpretive staff. This mentoring team will direct the Steward's effort, provide necessary training and access to resources, and support the Steward in achieving focal invasive species project goals. As s/he develops this project the Steward will meet and work with many park staff at the Preserve, and we will make

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opportunities for him/her to assist with other natural resource management projects as time allows. The Steward will coordinate a small group of volunteers and will draw upon their effort and skills to accomplish intensive field work and to develop and deliver interpretive programs. The Steward will work periodically at park headquarters, including meeting with park management to report on project activities and to learn more about NPS careers. Finally, we expect the Steward will meet with regional invasive species experts, including university researchers and extension staff. If the Steward wishes to develop this internship into a longer academic or volunteer commitment, the park will support that initiative to the best of our ability.

Background

Like most areas of intensive human management and modification worldwide, the subtropical coastal wetland landscape of the Mississippi River delta has become “home away from home” for an ever-increasing number of invasive species. Invasive species are species native to other regions that establish in new areas and increase their population size and their influence on indigenous species, communities, ecosystems, environmental conditions and human activities. Invasive species typically have negative impacts on native biota, ecosystem properties and services, and human values.

Located 15 miles south of New Orleans, Louisiana, the Barataria Preserve Unit of Jean Lafitte National Historical Park and Preserve protects 23,000 acres of coastal wetlands in the Mississippi River delta. These wetlands are among the most biologically productive ecosystems in North America and they sustain some of the most productive fisheries and abundant waterfowl populations on the planet. People have altered this landscape substantially, dissecting coastal wetlands with canals to access and extract natural resources (including abundant fossil fuel deposits) and to facilitate global-scale commerce, and constructing mechanical barriers to protect human settlements and commercial infrastructure from both river dynamics and strong tropical storms. Like most of the surrounding region, the Preserve is now perforated by canals and cut off from river influence and from its natural watershed. Several aggressive invasive species have rapidly changed the appearance of Preserve landscapes and habitats and we suspect they exert strong negative influences on native biota and ecosystem function. Working closely with the park’s natural resource management staff, the Environmental Steward will focus his/her full-time effort on key invasive species monitoring and management projects including invasive floating aquatic vegetation and feral hogs.

The Preserve (and the Park as a whole) aims to protect and conserve the natural landscape, its biological diversity, human history and the diverse cultural traditions it has inspired and nurtured. Invasive species threaten both the biological integrity of Preserve ecosystems and the cultural use and enjoyment of Preserve habitats. The park’s resource management and interpretation staff are charged with trying to control invasive species, and with effectively communicating these problems and our approaches to managing them to the public. We also wish to involve the public directly – via volunteer service – in our efforts to reduce invasive species populations and their impacts on these natural and cultural resources.

Over the past few decades a suite of invasive floating aquatic plant species have invaded waterways in the Barataria Preserve, so that their mats now prevent boat access to large areas of the Preserve for much of the year. Focal species include the Water Hyacinth – introduced about 100 years ago, Giant Salvinia – a comparatively recent invasive species in the northern Gulf Coast with an exceptionally rapid rate of population growth, and ‘Cuban’ nutsedge – another newer invader in the Preserve that utilizes mats made of other invasive floating aquatic species to establish. As a group, these are among the most problematic invasive species in the region and much effort is directed toward their control. Besides impeding boat access through waterways, these invasive plant species compete with native floating aquatic vegetation and change the quality of food available to wetland- and waterway inhabitants. While it is easy to detect their impact on the composition of floating aquatic plant communities, we

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suspect these invasive species dominated mats have cascading impacts on community structure and biological diversity and on ecosystem properties ranging from light penetration into the water column to patterns of productivity in the aquatic and adjacent terrestrial ecosystems.

Options for reducing invasive floating aquatic species' populations and the extent of their waterway coverage include herbicide application, mechanical removal and biological control. All of these approaches require frequent and spatially extensive effort, and the latter two require intensive investment of labor. Because herbicide treatment impacts all of the floating aquatic vegetation to which it is applied – not just the invasive species – as well as the diverse biota living in Preserve waterways, and because herbicide residues may remain in the ecosystem for decades, resource management staff prefer other alternatives. Mechanical removal requires substantial investments in equipment and labor and it impacts all of the floating aquatic vegetation, including native species. Biological control targets focal species only and requires no specialized equipment. For example, over the past several years researchers and natural resource managers throughout the tropics and subtropics have employed a specific insect herbivore – a species of weevil – to control and reduce invasive *Salvinia* populations. Agricultural extension experts and researchers at Louisiana State University have developed a bio-control approach using this weevil in which they introduce weevil-infested Giant *Salvinia* to waterways with Giant *Salvinia* invasions. As it needs more food, the weevil moves from the plants on which it is introduced to the *Salvinia* in the waterway, eating the growing points of these plants. Over time, weevil populations increase and their consumption of *Salvinia* can reduce, and potentially stop, the spread of this aggressive invader. These weevils specialize in eating *Salvinia* and they have not been observed changing their diet and moving to other plant species, so they are not considered a threat to native vegetation or to the native food web. In late summer 2011 park resource management staff introduced these weevils into selected Preserve waterways. With the assistance of AmeriCorps Environmental Stewards in 2012 and 2013, we developed this effort into a robust Giant *Salvinia* biocontrol program including interpretive outreach. We seek to extend our monitoring and bio-control effort to other aggressive invasive floating aquatic plant species, beginning with Water Hyacinth, for which two bio-control agents are being tested and used in Louisiana.

Working closely with the park's natural resource management and interpretation staff, the Environmental Steward will continue developing this effort into a vibrant integrative program addressing park needs and involving park volunteers. Key elements of this floating aquatic invasive species biocontrol program – and of the Steward's work – include sustaining the introduction and re-distribution of bio-control agents in selected waterways, implementing monitoring protocols assessing spatial coverage of floating aquatic invasive species and bio-control agent populations in these waterways, organizing and leading volunteer effort on this project, producing bi-weekly reports on waterway accessibility, and developing interpretive media and/or programs communicating the need for, aims of, and status of this project.

Like invasive floating aquatic plant species, feral hogs also have invaded regional coastal wetland landscapes, and their impacts at the Preserve began increasing noticeably in 2009, following the disruptive tropical storm years of 2005-2008. Feral hogs exhibit remarkably flexible habitat requirements and they can utilize a broad range of ecosystems to support their life activities. In addition to their direct trophic impacts on a smorgasbord of prey species and direct physical disruption of soils, vegetation and coarse woody debris, feral hog impacts on community structure and ecosystem properties and processes are well-documented. Their predators are few and population control efforts are complicated by this species' role in domestic livestock production. The park began developing a feral hog impacts assessment program in summer 2013. In collaboration with partner scientific

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investigators and park natural resource management staff, and with volunteer assistance, the Environmental Steward will hone (and potentially extend) this impacts monitoring program.